* NOTICES *

CLAIMS

[Claim(s)]
[Claim 1] The hot exhaust gas which occurs from said electric furnace in the operation process of an electric furnace for steel is led to a combustion chamber. Combustion decomposition of the dioxin in said exhaust gas is carried out by carrying out elevated-temperature combustion of the unburnt gas constituents in said exhaust gas in said combustion chamber. Subsequently, cool the hot exhaust gas discharged from said combustion chamber with a cooling system, lead this cooled exhaust gas to a dust collector, and said exhaust gas is set with this dust collector to the offgas treatment approach of the electric furnace for steel which carries out purification processing. The hot exhaust gas which occurs within said electric furnace is burned in the combustion chamber in which it was prepared by the head-lining section of said electric furnace. Lead the exhaust gas which burned in this combustion chamber to a combustion chamber, and the exhaust gas which burned in this combustion chamber is led to a quench tower. The offgas treatment approach of the electric furnace for steel which leads the exhaust gas which cooled said exhaust gas to 80 degrees C or less, and was subsequently cooled to said 80 degrees C or less in this quench tower to a bag filter, and is characterized by said thing [carrying out emission gas purification] with this bag filter.
[Claim 2] The combustion chamber prepared in the head-lining section of the back quantity type electric furnace for steel manufacture, and said electric furnace which burns the unburnt gas constituents in the exhaust gas which occurs from said electric furnace, Offgas treatment equipment of an electric furnace for steel characterized by having the combustion chamber which burns further the exhaust gas discharged from said combustion chamber, the quench tower which cools the exhaust gas discharged from said combustion chamber, and the bag filter which carries out purification processing of the dust from the exhaust gas discharged from this quench tower.
[Claim 3] Said electric furnace is offgas treatment equipment of an electric furnace for steel according to claim 2 characterized by forming the burner for auxiliary combustion in the furnace wall upper part.
[Claim 4] Offgas treatment equipment of an electric furnace for steel according to claim 2 or 3 characterized by sealing-izing while reaching [from said electric furnace] even said combustion chamber.

[Translation done.]

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the approach and such equipment which are the technique which cools the exhaust gas which occurs from an electric furnace, and carries out defecation processing during operation of the electric-furnace-for-steel facility for dissolving and refining an iron scrap etc. and manufacturing steel, control generating of toxic materials, such as dioxin contained especially in this exhaust gas, and are removed.
[0002]
[Description of the Prior Art] In an electric furnace for steel, the heating dissolution is usually carried out by arc energy or radio-frequency energy by using an iron scrap as the main raw material, oxidizing refining and reduction refinement are performed, tapping of the molten metal is carried out to a ladle, alloy iron is added in that case, the component of a molten metal is adjusted, and molten steel is manufactured. Thus, the heating dissolution of the iron scrap is carried out by the electric furnace for steel, the obtained molten metal is refined, tapping is carried out to a ladle, and exhaust gas occurs from an electric furnace in a series of processes which carry out the waste of the slag. In this exhaust gas, it is CO, CO2, N2, O2, and H2. And the dioxin which is a toxic material is contained besides gas constituents, such as H2O, iron-oxide fines, and a high vapor pressure metallic element like Zn or Sn. The generation source of dioxin is in the iron scrap of a dissolution main raw material at the chlorinated organic compound resulting from the vinyl chloride currently adhered and mixed, a plastic coating, etc., and when these burn under predetermined conditions, it is generated. After it is cooled with predetermined equipment, being led to a dust collector, removing dust, and performing defecation processing, consequently dust content, harmful matter constituent concentration, etc. in exhaust gas becoming below default value, stripping of the exhaust gas which occurs from an electric furnace is carried out to atmospheric air. Therefore, to operate under conditions which dioxin does not generate is desired in operation of an electric furnace for steel.
[0003] The outline flow Fig. of the example of offgas treatment equipment of the conventional electric furnace for steel is shown in drawing 3 . For an electric furnace for steel and 2, in this drawing, a combustion chamber and 2' of secondary combustion equipment and 9' are [1 / a sprinkler-system spray cooling tower and 12] dust collectors. While leading hot exhaust gas 1a generated from the electric furnace 1 to a combustion chamber 2 and burning the combustible gas in exhaust gas, exhaust gas is heated by the burner which is secondary combustion equipment 2' further, the exhaust gas temperature is raised, and combustion decomposition of the dioxin in exhaust gas is carried out. Subsequently, indirect cooling is carried out through the exhausted exhaust gas at the water-cooled duct 3, and it leads to sprinkler-system spray cooling tower 9', and cools directly.
[0004] In this exhaust gas cooling, in order to prevent the re-composition reaction of dioxin, exhaust gas temperature quenches the between from about 350 degrees C or more to about 250 degrees C or less. When this quenching is insufficient, exhaust gas becomes dirty by re-composition of dioxin. Uptake of the dust to which lowered desirably the exhaust gas

temperature in the bag filter inlet port as a dust collector 12 to 80 degrees C or less, dioxin was made to stick to the dust in exhaust gas, and dioxin stuck is carried out with a bag filter. In this way, exhaust gas 14a from which dioxin and dust were removed is diffused from a chimney stack 14 (henceforth "the advanced technology 1").

[0005] Moreover, in operation of an electric furnace for steel, for example, the patent number No. 2596507 official report is indicating the following approach as a technique of preventing generating of dioxin. To the low-temperature exhaust gas which occurred from the electric furnace, an adsorbent is blown in the middle of a duct into raw material insertion and tapping, and the dioxin in exhaust gas is made to adsorb, the dust (harmful dust) containing the adsorbent with which the through lever became dirty about the filter in the exhaust gas containing the adsorbent which became dirty from dioxin is separated from exhaust gas, these harmful dust is collected, and it blows in into an electric furnace again. As opposed to the hot exhaust gas which occurred from the electric furnace during the dissolution / refinement on the other hand It changes into the exhaust gas which exhaust gas was burned supplying energy from the exterior, was made to decompose dioxin, and was defanged. This exhaust gas is cooled through a water-cooled duct, and another cold blast which does not contain dioxin in this further is mixed, it cools, and the dust which does not contain dioxin in a filter through this is separated (henceforth "the advanced technology 2").

[0006]

[Problem(s) to be Solved by the Invention] There is the following trouble in the advanced technology mentioned above. According to the advanced technology 1, the dioxin in exhaust gas can be made to decompose certainly by managing the service condition of secondary combustion equipment. However, since it is the approach of forming secondary combustion equipment, making carry out the secondary combustion of the dioxin in exhaust gas, and making it decompose, an economy top problem remains from that the running cost of secondary combustion equipment starts, and leading to excessive energy expenditure. Moreover, the cooling power of the elevated-temperature exhaust gas discharged from the combustion chamber is raised efficiently, and ED for lowering stably the exhaust gas temperature before going into a dust collector to 80 degrees C or less is desired.

[0007] Although the process which blows the dust containing the dioxin in exhaust gas into an electric furnace again must be carried out in the advanced technology 2, development of the approach of it being stabilized safely and performing this process is desired, and a problem remains.

[0008] Therefore, the technical problem of this invention makes the most of the total energy of the sensible heat of electric furnace exhaust gas, and the latent heat, avoids excessive energy expenditure as much as possible, and is to develop the offgas treatment approach of an electric furnace and equipment which can make conditions required for combustion decomposition of dioxin maintain stably. And the purpose of this invention is by solving the above-mentioned technical problem to carry out defanging processing of the dioxin mixed in electric furnace exhaust gas cheaply at insurance.

[0009]

[Means for Solving the Problem] From a viewpoint mentioned above, research was repeated wholeheartedly that the offgas treatment approach of an electric furnace for steel should be developed. this invention person etc. investigated the level of total of the energy which the exhaust gas which occurs from an electric furnace for steel has first. Drawing 2 is the case where the burner which is the combustion chamber outlet temperature in the conventional electric furnace operation shown in drawing 3 , and is secondary combustion equipment 2' (refer to drawing 3) is not used, and is a graph which shows an example of aging of the exhaust gas temperature usually generated from an electric furnace in the heat under continuation operation in an operating condition. When it assumes that accumulation of the exhaust gas sensible heat discharged from a combustion chamber was equalized in 1 thermo-cycle time zone, and this average sensible heat was given to exhaust gas so that drawing 2 may show, the exhaust gas mean temperature in this case is **** or ** about becoming about 900 degrees C or more.

Moreover, it is thought that this exhaust gas mean temperature is greatly dependent on an electric furnace operating condition. Then, this invention person etc. thought it important first whether what we would do with the perfect combustion of the electric furnace exhaust gas irrespective of fluctuation of an electric furnace operating condition as a basic technique. Furthermore, according to the latest research, it is becoming clear that it is required to consider as the conditions which generally carry out combustion decomposition of the dioxin, and to make it maintain 1 second or more above 850 degrees C.

[0010] In consideration of the above-mentioned situation, it is made a configuration which this invention person etc. expands [configuration] the space volume in a furnace of an electric furnace, and promotes mixing of the exhaust gas in the space in a furnace, So that the exhaust gas residence time in preparing the combustion chamber of exhaust gas in the head-lining section in an electric furnace furnace and an exhaust gas combustion chamber may be lengthened as much as possible By combining lengthening die length greatly [bore], the knowledge that it was possible to fulfill the combustion decomposition conditions of dioxin was acquired. Moreover, it hit on an idea of being effective for lowering exhaust gas temperature to 80 degrees C or less certainly by adopting quenching etc. as an approach which is stabilized and strengthens exhaust gas cooling power.

[0011] This invention is made based on the above-mentioned knowledge, and that configuration is as follows. In addition, if the exhaust gas which occurred from the electric furnace is used as the parent with exhaust gas in this specification, in a subsequent offgas treatment process, air will not be attracted by this, a combustion front stirrup will not be the back, or it will not be concerned with whether dioxin, dust, an adsorbent, etc. are included, but will be made exhaust gas.

[0012] The offgas treatment approach of an electric furnace for steel according to claim 1 The hot exhaust gas which occurs from an electric furnace in the operation process of an electric furnace for steel is led to a combustion chamber. Combustion decomposition of the dioxin in this exhaust gas is carried out by carrying out elevated-temperature combustion of the unburnt gas constituents in this exhaust gas in a combustion chamber. Subsequently, cool the hot exhaust gas discharged from the above-mentioned combustion chamber with a cooling system, lead this cooled exhaust gas to a dust collector, and the above-mentioned exhaust gas is set with this dust collector to the offgas treatment approach of the electric furnace for steel which carries out purification processing. The hot exhaust gas which occurs within the above-mentioned electric furnace is burned in the combustion chamber in which it was prepared by the head-lining section of an electric furnace. Lead the exhaust gas which burned in this combustion chamber to a combustion chamber, and the exhaust gas which burned in this combustion chamber is led to a quench tower. The exhaust gas which cooled the above-mentioned exhaust gas to 80 degrees C or less, and was subsequently cooled [above-mentioned] to 80 degrees C or less in this quench tower is led to a bag filter, and it has the description to purify the above-mentioned exhaust gas with this bag filter.

[0013] The offgas treatment equipment of an electric furnace for steel according to claim 2 The combustion chamber prepared in the head-lining section of the back quantity type electric furnace for steel manufacture, and the above-mentioned electric furnace which burns the unburnt gas constituents in the exhaust gas which occurs from this electric furnace, It has the description to have had the combustion chamber which burns further the exhaust gas discharged from this combustion chamber, the quench tower which cools the exhaust gas discharged from this combustion chamber, and the bag filter which carries out purification processing of the dust from the exhaust gas discharged from this quench tower.

[0014] In claims 1 and 2, a cyclone type quench tower or a multipipe quench tower can use it preferably as a quench tower. The offgas treatment equipment of an electric furnace for steel according to claim 3 has the description in invention according to claim 2 for the burner for auxiliary combustion to be formed in the furnace wall upper part of an electric furnace.

[0015] The offgas treatment equipment of an electric furnace for steel according to claim 4 has the description in invention according to claim 2 or 3 for while reaching [from an electric

furnace] even a combustion chamber to be sealing-ized.
[0016]
[Embodiment of the Invention] Next, this invention is explained, referring to a drawing. Drawing 1 is the outline flow Fig. showing the example of offgas treatment equipment for enforcing the offgas treatment approach of the electric furnace this invention. This equipment consists of electric furnace 1, combustion chamber 3, combustion chamber 2, quenching equipment, and dust collector 12 grade. Hot exhaust gas 1a generated from the electric furnace 1 is needed for the combustion chamber 3 first prepared in the head-lining section of an electric furnace 1, gives the residence time and burns it primarily here. The exhaust gas which burned primarily and became an elevated temperature goes into a combustion chamber 2 through the castable-refractory duct 4. A combustion chamber 2 enlarges a cross sectional area and height, improves churning of exhaust gas, it designs it so that the residence time may become long, and it has been made to be carried out in the perfect combustion of exhaust gas. It is made for 800 degrees C or more of exhaust gas temperature of combustion chamber 2 outlet to become 850 degrees C or more desirably, and exhaust gas is operated so that the holding time with a temperature of 850 degrees C or more may become 1 seconds or more. In this way, the dioxin in exhaust gas is understood a burned part. Subsequently, exhaust gas is in the cyclone type quench towers 9 and 10 through the castable-refractory duct 5 heat-resistant in the elevated-temperature condition. An exhaust gas cooling means may be a multipipe quench tower instead of a cyclone type quench tower. In drawing 1 , two cyclone type quench towers are arranged to the serial. The configuration of a quench tower may increase the base according to required refrigeration capacity. In that case, arrangement of a cooling tower combines serial arrangement and a parallel arrangement suitably. In this way, exhaust gas temperature is lowered from about 850 degrees C to 80 degrees C or less. In the meantime, re-composition of dioxin is inhibited by quenching from 350 degrees C or more to 250 degrees C or less. Since exhaust gas temperature goes into the bag filter as a dust collector 12 below 80 degrees C, even when dioxin exists slightly in exhaust gas, where the dust in exhaust gas is adsorbed, it is caught by the filter. And stripping of the poor exhaust gas 14a is carried out from a chimney stack 14 in an operation of a fan 7 in purification processing.
[0017] In addition, if building dust collection exhaust gas (not shown) is mixed to the exhaust gas cooled in the cyclone type quench tower 10, the exhaust gas temperature included in a dust collector 12 will be stabilized further, and will become low. The greatest descriptions of this invention are giving the combustion chance of exhaust gas twice, making churning of exhaust gas active moreover, and aiming at perfect combustion, and using the large cooling system of the quenching effectiveness.
[0018] In addition, as a cure at the time of unsteady operation of an electric furnace, or abnormality operation, are the downstream of a cooling system, install adsorbent blowing-in equipments (not shown), such as activated carbon and a calcium hydroxide, in the middle of the duct of the upstream of a dust collector, blow an adsorbent, the dioxin contained in exhaust gas is made to adsorb, dust is removed after an appropriate time, and pure exhaust gas is diffused.
[0019]
[Effect of the Invention] In inhibiting generating of the dioxin contained in the exhaust gas which occurs from an electric furnace in the operation process of an electric furnace for steel according to this invention, as stated above, the energy which the exhaust gas which occurs from an electric furnace has can be used effectively. Moreover, since refrigeration capacity can be enlarged easily, exhaust gas temperature by the side of dust collector close can be made low. Therefore, it is stabilized and dioxin can be removed from exhaust gas. The offgas treatment approach of the electric furnace for steel which demonstrates such effectiveness, and equipment can be offered, and useful effectiveness is brought about on industry.

[Translation done.]

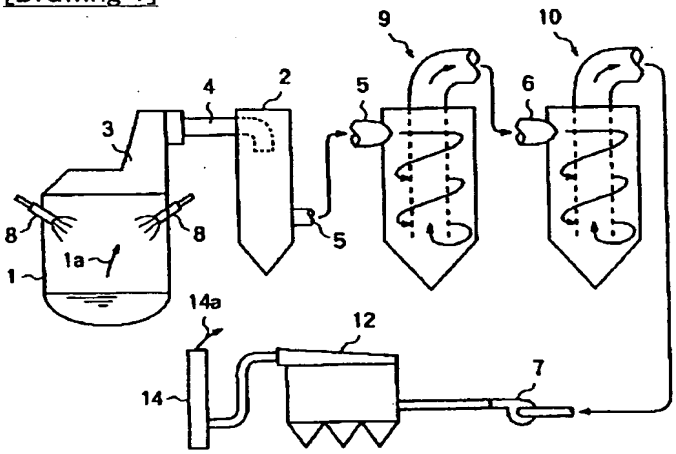
DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the outline flow Fig. showing the example of offgas treatment equipment for enforcing the offgas treatment approach of the electric furnace this invention.
[Drawing 2] It is the graph which shows an example of aging of the exhaust gas temperature in the outlet of the exhaust gas combustion chamber between 1 thermo cycles in the usual electric furnace operating condition.
[Drawing 3] It is the outline flow Fig. of the example of offgas treatment equipment of the conventional electric furnace for steel.
[Description of Notations]
1 Electric Furnace for Steel
1a Exhaust gas
1b Elbow tubing
1c Sliding tubing
1d Collecting smoke tubing
2 Combustion Chamber
2' secondary combustion equipment
3 Combustion Chamber
4 Castable-Refractory Duct
5 Castable-Refractory Duct
6 Castable-Refractory Duct
7 Fan
8 Burner
9 Cyclone Type Quench Tower
9' Water spray cooling tower
10 Cyclone Type Quench Tower
12 Dust Collector
13 Combustion Controlling Mechanism
14 Chimney Stack
14a Exhaust gas

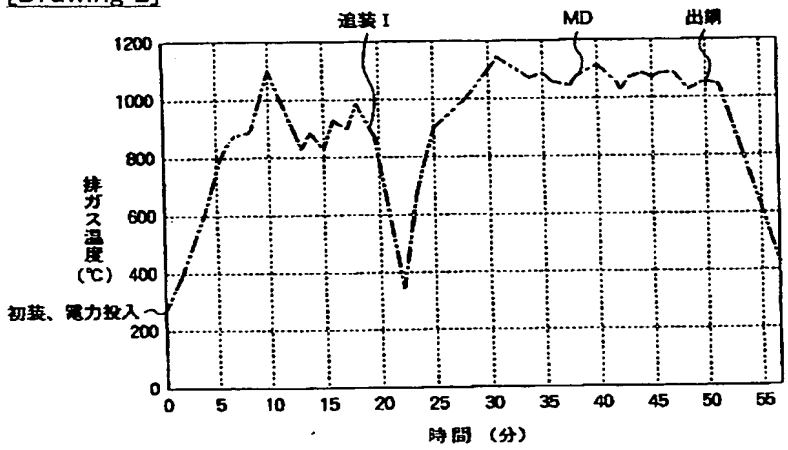
[Translation done.]

DRAWINGS

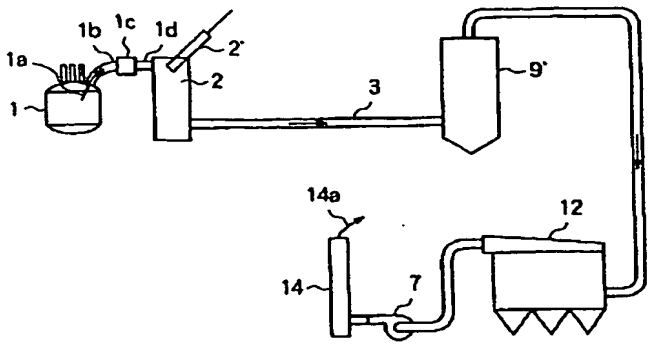
[Drawing 1]



[Drawing 2]



[Drawing 3]



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